

The opinion in support of the decision being entered today was **not** written for publication and is **not** binding precedent of the Board.

Paper No. 21

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte HIKOHARU AOKI

Appeal No. 2000-1371
Application No. 08/867,810

HEARD: APRIL 10, 2002

Before RUGGIERO, SAADAT, and DIXON, **Administrative Patent Judges**.
DIXON, **Administrative Patent Judge**.

DECISION ON APPEAL

This is a decision on appeal from the examiner's final rejection of claims 1, 2, 4-11, and 13-16, which are all of the claims pending in this application.

We AFFIRM-IN-PART.

BACKGROUND

The appellant's invention relates to a nozzle plate and a manufacturing process thereof. An understanding of the invention can be derived from a reading of exemplary claim 1, which is reproduced below.

1. A nozzle plate for an ink jet head provided with nozzle orifices though which ink is to be ejected,

wherein the nozzle orifices are formed in the nozzle plate by an excimer laser device with a working lens which has a numerical aperture (NA) set to 0.13 or more and 0.35 or less,

wherein the range of the numerical aperture is determined based on size of a round portion produced around the nozzle orifice and a focal depth of an optical system used in the excimer laser device,

and wherein the value 0.13 is selected so that an amount of the round portion becomes lower than a predetermined amount, and the value 0.35 is selected so that the nozzle plate and the working lens are easily positioned when the nozzle orifices are formed by the excimer laser device.

The prior art references of record relied upon by the examiner in rejecting the appealed claims are:

Watanabe et al. (Watanabe)	5,208,604	May 4, 1993
Smith et al. (Smith)	5,538,817	Jul. 23, 1996
Hirukawa et al. (Hirukawa)	5,703,675	Dec. 30, 1997

Claims 1, 2, 6, 8-11 and 15 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Smith. Claims 3-5 and 12-14 stand rejected under 35 U.S.C.

§ 103(a) as being unpatentable over Smith in view of Hirukawa.¹ Claim 7 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Smith and Hirukawa in view of Watanabe.

Rather than reiterate the conflicting viewpoints advanced by the examiner and appellant regarding the above-noted rejections, we make reference to the examiner's answer (Paper No. 15, mailed Aug. 8, 1999) for the examiner's reasoning in support of the rejections, and to appellant's brief (Paper No. 14, filed May 20, 1999) and reply brief (Paper No. 16, filed Sep. 29, 1999) for the appellant's arguments thereagainst.

OPINION

In reaching our decision in this appeal, we have given careful consideration to appellant's specification and claims, to the applied prior art references, and to the respective positions articulated by appellant and the examiner. As a consequence of our review, we make the determinations which follow.

Appellant has elected to group claims into four separate groups. (See brief at page 8.) In the reply brief at pages 1-2, appellant further details the groupings. Group 1 is directed to a product by process; Group 2 is directed to considerations of determining the range of NA; Group 3 relates to a method of producing the heads; and

¹ We note that the examiner has included claims 3 and 12 in the statement of the rejection, but these claims were canceled in the after final amendment filed Mar. 1, 1999. Therefore, we will not address these two claims in our decision.

Group 4 relates to consideration in determining the range of NA. Therefore, we will select a single claim from each group as representative of the group.

GROUP 1

With respect to independent claim 1, we agree with appellant that claim 1 is a product by process claim (reply brief at page 1) wherein the limitations of the process do not distinguish the product. Our reviewing court has stated that:

[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process.

In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

From our analysis of the instant claim limitations, we find that claim 1 is directed to a "nozzle plate for an ink jet head provided with nozzle orifices through which ink is to be ejected" having an "amount of the round portion [becomes] lower than a predetermined amount." Here, we find that the prior art nozzle plates would have been manufactured to some set standards, and they would have necessarily had an "amount of the round portion lower than a predetermined amount," where the predetermined amount may be any set value or threshold which may be used in a quality check of the manufacturing. The examiner maintains that Smith teaches:

[i]n certain applications, notably ink jet nozzle production, it is desirable to control the exact fluence profile on the workpiece in order to achieve specific wall slopes and shapes. This much is set forth in Smith et al. U.S.

patent application Ser. No. 08/215,851 filed Mar. 21, 1994 entitled Apparatus and Process for Optically Ablated Openings Having Designed Profile. This reference requires that the profile of ablation over the area of an opening in a workpiece be carefully controlled. [See Smith at col. 1 lines 35-38.]

Clearly, Smith teaches that it is desirable to control the manufacture of the openings and that there would be a need or desire to have them meet a predetermined quality. Therefore, we find that the nozzle plate taught and suggested by Smith would have met the article of manufacture limitations as recited in independent claim 1.

Appellant argues that the reduction in "sag" or rounding is attributable to a manufacturing process where the numerical aperture of the working lens is controlled to be in a set range and that this range simplifies the alignment of the nozzle plate and lens. (See brief at page 13.) We find that the recited process limitations and range do not limit the product. Appellant argues that Smith neither recognizes the problem of "sag" nor the correlation of "sag" and numerical aperture. (See brief at pages 13-14.) We find that these arguments are not supported by the product limitations recited in claim 1. Therefore, we will sustain the rejection of independent claim 1 and dependent claims 2 and 6-9 which were grouped with claim 1 by appellant.

With respect to appellant's response to the examiner's argument concerning routine experimentation, at page 14 of the brief, we do not find these arguments to the process persuasive to article limitations in independent claim 1.

GROUP 3

With respect to Group 3, we select independent claim 10 as representative of the Group. Appellant argues that claim 10 is directed to a method of manufacturing a nozzle plate with a nozzle orifice rounded portion (sag) below a predetermined amount using an excimer laser and a working lens having a numerical aperture in the range of 0.13 to 0.35. (See brief at page 16 and reply at page 4.) We agree with appellant. Appellant argues that Smith and Watanabe (applied to dependent claim 16) fail to recognize the problem of "sag" and the correlation of numerical aperture and "sag." We agree with appellant. Appellant argues that neither Smith nor Watanabe provides a suggestion or motivation to change their structure. We agree with appellant. Nor do we find that the examiner has provided a convincing line of reasoning for modifying the method of Smith to use the numerical aperture in the claimed range to reduce "sag."

The examiner relies on routine experimentation to achieve the claimed range and relies upon a stated relationship in Smith as a motivation to modify the numerical aperture. (See final rejection at page 3 for the statement of the rejection as incorporated into the answer and answer at pages 4-5.) We disagree with the examiner, and find that this is at best an invitation to try. Without a recognition of the problem, the skilled artisan would have no motivation to use routine experimentation in Smith to manipulate the numerical aperture. From our review of Watanabe, Watanabe does not remedy this deficiency in Smith. Therefore, we will not sustain the rejection of independent claim 10 and dependent claims 11, 15, and 16 as grouped by appellant's.

GROUPS 2 AND 4

We address these claims together since they are directed to similar limitations and the examiner relies on the same prior art. We have sustained the examiner's rejection based upon product claims and reversed the examiner's rejection of the method. Here, these claims depend upon both the article claim and the process claim. The examiner relies upon the teachings of Hirukawa to teach and suggest the manipulation of the focal depth and numerical aperture to "achieve desired results in ablation procedures." (See final rejection at page 4 as incorporated into the answer.) While we agree with the examiner that these values may be controlled, the examiner has not identified why it would have been obvious to one of ordinary skill in the art at the time of the invention to control them for a specific reason, such as to reduce the "sag" or rounding in manufacture of an ink nozzle. Appellant argues that Smith and Hirukawa do not recognize the problem of sag and the relationship of numerical aperture and focal depth. We agree with appellant. The examiner finds the word "sag" in Hirukawa at col. 14, but no explanation or identification that it is the same as "sag" in the present invention. Furthermore, the teachings of Hirukawa concerning the numerical aperture and depth of focus at col. 3 are disclosed in the background as a "proposed" method of selecting a combination of factors. We do not find this to be specific motivation which would have motivated skilled artisans to use the specified range and achieve the specific values for the article of manufacture as the examiner suggests.

Additionally, the examiner does not address the specific process limitations which result in specific dimensional limitations on the article of manufacture. Nor has the examiner provided a line of reasoning why the teachings of Smith or Hirukawa would have suggested these specific limitations on the round portion and the focal depth. Therefore, we find that the examiner has not established a ***prima facie*** case of obviousness with respect to dependent claims 4, 5, 13, and 14, and we have not sustain the rejection of these claims.

CONCLUSION

To summarize, the decision of the examiner to reject claims 1, 2, and 6-9 under 35 U.S.C. § 103(a) is affirmed. The decision of the examiner to reject claims 4, 5, 10, 11, and 13-16 under 35 U.S.C. § 103(a) is reversed

No time period for taking any subsequent action in connection with this appeal
may be extended under 37 CFR § 1.136(a).

AFFIRM-IN-PART

JOSEPH F. RUGGIERO
Administrative Patent Judge

JOSEPH L. DIXON
Administrative Patent Judge

MAHSHID D. SAADAT
Administrative Patent Judge

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